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IN THE

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, A. D. 1938.

THE MAYTAG COMPANY,
Petitioner,

vs.

HURLEY MACHINE COMPANY and ELECTRIC HOUSEHOLD UTILITIES CORPORATION,
Respondents.

THE MAYTAG COMPANY,
Petitioner,

vs.

EASY WASHING MACHINE CORPORATION,
Respondent.

No. 76 - 77

APPENDIX TO

BRIEF FOR PETITIONER.

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INDEX.

The Maytag Co. *v.* Brooklyn Edison Co., 11 S. Supp. 743, E. D. N. Y., Judge Byers.

Findings of Fact 1
Conclusions of Law 12

The Maytag Co. *v.* General Electric Supply Corp., W. D. Mo., W. Div., Judge Otis.

Memorandum Opinion 13
Findings of Fact 17
Conclusions of Law 42
Decree 44

Jardine British patent No. 18,202 of 1891 46
Davis patent No. 1,240,826 of September 25, 1917 51
Doughty & Davis patent No. 1,496,305 of June 3, 1924 54

APPENDIX.

Findings of Fact and Conclusions of Law.

IN THE
UNITED STATES DISTRICT COURT,
EASTERN DISTRICT OF NEW YORK.

THE MAYTAG COMPANY,
Plaintiff,
vs.
BROOKLYN EDISON CO., INC.,
Defendant.
} In Equity No. 6888.

The issues in this suit having duly come on to be heard by the Court at a stated term, held by the undersigned without a jury, and the proofs, arguments and briefs of plaintiff and defendant having been duly considered, and due deliberation having been had, I decide and find as follows:

FINDINGS OF FACT.

1. Plaintiff, The Maytag Company, is the sole owner of the Snyder letters patent in suit No. 1,866,779 issued to it July 12, 1932, Claims 23, 26 and 38 of which are here asserted. Plaintiff has its principal place of business in Newton, Iowa, where it has been engaged continuously since early in 1922 in the manufacture, sale and use of washing machines embodying and utilizing the invention of said Snyder patent. Specimens of these Maytag machines are in evidence as Plaintiff's Exhibits 9, 10 and 11. These machines have been extensively sold and used throughout the United States.

2. Defendant, Brooklyn Edison Company, is a corporation existing under and by virtue of the laws of the State of New York, having an office and regular established place of business in Brooklyn, within the Eastern District of New York, where subsequent to notice of infringement of the Snyder patent and between July 12, 1932, and before the filing of this suit it demonstrated, used and sold washing machines manufactured by other companies, as follows:

(a) The "A B C" machine, made by Altorfer Bros. Company, of Peoria, Illinois. (Illustrated in evidence by Plaintiff's Exhibits 73.)

(b) The "Thor" machine, made by the Hurley Machine Company and its successor, Electric Household Utilities Corporation, of Chicago, Illinois. (Illustrated in evidence by Plaintiff's Exhibits 80 and 89.)

(c) The "Easy" machine, made by the Easy Washing Machine Corporation of Syracuse, New York. (Illustrated in evidence by Plaintiff's Exhibit 1.)

Defendant also issued advertisements and instructions, furnished it by these manufacturers, in connection with the demonstration and sale of these machines.

3. Each of said defendant's machines, A B C, Thor and Easy, employs and utilizes the invention of said Snyder patent and operates in substantially the same way as the Maytag machines made thereunder by the plaintiff. A comparison of the Maytag machines and said defendant's machines, as supplemented by the testimony, reveals unmistakably that there is no fundamental difference between them. The mechanism, method of operation and the physical characteristics are in such close resemblance that the issue of infringement presents no problems.

4. The numerous tests made on behalf of the defend-

ant in open court failed to establish its contentions that said Maytag and the defendant's machines do not operate in accordance with the description and claims of the patent in suit.

5. Actual observation of the operations of plaintiff's and defendant's Easy machine in open court demonstrated that each when not overloaded operates in substantial accordance with the teachings of the Snyder patent and the claims here asserted, and it is also apparent from the record that the Thor and A B C machines operate in substantially the same manner as each of these machines.

6. Successive types of washing machines previous to the Snyder invention have been known as the rubboard, the peg-dolly, the oscillating type, the cylinder type and the vacuum-cup type, of which the peg-dolly was probably in greatest distribution between 1915 and 1920. For many years prior thereto washing machines had come to occupy an important part in the domestic economy of the country. The mitigation of the rigors of a prosaic task which was their purpose has been a constant challenge to inventive skill from 1809. The operations of the various types of washing machines which preceded the machine of the patent in suit consisted of so disposing of mechanical agents in a closed container or wash tub that the necessary deformations of the threads of the fabrics being washed was undertaken by subjecting the fabrics to contact with ribs or corrugations or similar obstacles contained in the tub itself.

7. The teaching of the Snyder patent, stated in simple language, is that it departed from the understanding prevalent in 1920 or thereabouts that washing machine technique required for its success a method of rubbing, dragging, squeezing, twisting and manipulat-

ing the clothes within the tub so as to duplicate the process involved in the manual use of the scrub or wash board, when washing was accomplished entirely by hand, and substituted for that a process of contorting the fabrics mainly by water action, so that the deformation of threads and consequent dislodgment and migration of foreign particles from the meshes and threads themselves would be accomplished without subjecting the fabrics to the heavy wear and tear previously encountered. The Snyder invention accomplished this new result. It washes clothes satisfactorily. It was a response to repeated efforts to meet known requirements, has been commercially successful and has largely supplanted the previous types of machines.

8. The Snyder invention, as embodied in the Maytag machine, consists of a tub, in the bottom of which is a power-driven impeller called a gyrator, consisting of a disc substantially less in diameter than the tub, having a cone-shaped center, and upon the disc are mounted four radially disposed blades. This impeller is oscillated at such speed as to set in motion violently opposed currents of water which establish a flow outward from the bottom center of the tub, upward at the sides to the surface of the water, and back to the center and down to the inner portion of the impeller blades. The fabrics being washed, if the mass is not too great, follow that course, turning over constantly. The water is hot and contains soap, and at the end of ten minutes, more or less, the fabrics so treated are cleansed. The success of the operation is not questioned.

9. The specifications of the Snyder patent are sufficiently "full, clear, concise and exact" as to enable manufacturers to make the Snyder washing machine and operate it in accordance with the teachings of the patent. The drawings forming a part of the applica-

tion have not been criticized by the defendant, and when they are read with the recitals it cannot be said that the patentee failed to lay bare his concept, and the way in which he embodied it, with sufficient definition to apprise the public and those possessing the conventionally denominated skill of the metes and bounds of the invention.

10. The Snyder machine was a new step and an advance over previous machines in that the water action became the major factor in the operation and so functioned as to distort and manipulate the fabrics and thereby cause deformation of the thread. If this was aided by such contact with the impeller as does take place (Snyder did not teach its absence) the latter is the subordinate and not the dominant phase of the accomplishment. Deformation of the threads is essential. When Snyder said that he caused the several threads to be acted upon as a result of the interplay of the interposed currents of water upon the fabrics which were set in motion by the impeller, as he described, he made a statement which has not been disproved by the evidence in this case.

11. The Maytag machine, embodying the Snyder invention, was first put on the market in 1922 and substantial sales were made in that year; subsequent commercial success has rewarded the plaintiff, so that down to the trial some 2,000,000 machines have been sold, of which 172,000 had the low center post illustrated in the patent, and the balance the high center post later adopted. That element is conceded not to affect the issues here involved.

12. Comparatively little advertising of the Maytag machine embodying the Snyder invention was done down to 1925, but its sales were naturally accompanied by increasing publicity and large sums came to be ex-

pended for advertising in later years. This was after competitors' machines of the same type appeared upon the market.

13. At the outset the dealers were skeptical concerning the claims of the plaintiff that its new washing machines so operated as to wash clothes by water action. Competitors who were then selling the various types of previous machines above referred to fostered that skepticism. It is not contradicted that plaintiff's machine was referred to in trade circles as an ensilage cutter, and was otherwise derided both by dealers and salesmen from competing manufacturers.

14. Contemporaneously with the early introduction of the Maytag machines the A B C Company and the Easy Company, manufacturers of the defendant's A B C and Easy machines, respectively, acquired Maytag machines, embodying the Snyder invention, for the information of their experimental staffs.

15. In about 1925 and 1926 competitors' machines appeared upon the market of the same type as Maytag, that is, they had a bottom positioned impeller, power driven, and of the same general appearance, and the same claims were made for them in pamphlets issued by the manufacturers as were made by the Maytag Company, namely,—that in these machines, washing was done by water action with resulting saving in time and wear and tear upon the fabrics. That condition has continued to prevail down to the time when this suit was started.

The assertions in all of the advertising matter, and there is a substantial bulk in evidence, are flamboyant and unrestricted to the effect that the A B C, Easy and Thor washing machines do their work by water action, etc. The defendant itself distributed some of these pamphlets.

16. The issuance of the Snyder patent was delayed for over six years by a vigorously contested interference proceeding resulting in a decision in Snyder's favor by the Court of Customs and Patent Appeals (*Unruh* v. *Snyder,* 49 Fed. (2d) 1038) and another such proceeding was attempted by Altorfer without success. The consideration given the Snyder invention and application by the various tribunals of the Patent Office and the Court during these proceedings and the unusual strain and stress of this searching process strengthens the usual presumption arising out of the issue of a patent.

17. None of the prior patent, publications, uses or prior inventions relied upon by the defendant show or disclose a washing machine or method of washing fabrics such as shown and described in the patent in suit or set forth in Claims 23, 26 and 38 thereof, or any which negative the patentable novelty of any of these claims. (See opinion filed July 19, 1935.)

18. Having examined the prior patents relied upon by the defendant, it is apparent that none of these accomplish the water action of the Snyder patent in washing clothes, fabrics and the like, and that the presence of a suggestion as to water action contained in some of them does not establish anticipation of Snyder. Various of the patents referred to fall within the general category of unsuccessful efforts to accomplish the cleansing of fabrics mainly by water action. The art prior to 1922 did not contain a machine that accomplished the results of the Snyder machine. Once the distinction is grasped between intention and accomplishment as revealed in the several prior patents, it becomes apparent that the presence of the former does not establish anticipation of the latter.

19. None of the accused A B C, Thor or Easy ma-

chines measurably approaches any of those described in the prior patents relied upon by the defendant.

20. As the result of observations of numerous demonstrations in the court room with washing machines of the Maytag type, embodying the Snyder invention, including those of plaintiff's manufacture and the Easy machine here charged to infringe, this Court finds that the major factor in cleansing the fabrics is the water action which so functions as to distort and manipulate the fabrics and thereby to cause thread deformation; such contact between the fabrics and the impeller as does take place, is the subordinate and not the dominant phase of the accomplishment.

To liken the effect of the impeller blade upon adjacent fabrics to the pounding of clothes upon a rock, practiced in primitive days, is to fail entirely to distinguish between an underwater thrust and a blow delivered out of water. The force of the motion of the impeller blade is largely expended in moving the water in which the impeller is immersed, and while there is seemingly an observable contact between the fabrics and the impeller when even a normal or capacity load of materials is treated, the actual striking energy of the blade is obviously inconsiderable; no persuasive demonstration was made by the defendant whereby such energy was recorded in terms of force or power. The defendant has failed to prove that it is impossible to wash fabrics in the Maytag or other machines of the same type according to the teachings of the patent.

21. The numerous demonstrations of plaintiff's and defendant's Easy machine in the court room were carefully observed by the Court for long periods of time. Some of them were conducted in glass tubs so illuminated as to reveal all that the eye can perceive. The

Court's observation of these demonstrations was as follows:

(a) The course of flow described in the patent takes place in all these machines;

(b) There was a constant turning of fabrics called roll-over which was not impeded by the temporary engagement of the materials with the impeller;

(c) There was a flexing and doubling back of the fabrics as they were driven in and around the tub by the violently flowing opposed currents of liquid created by the impeller;

(d) There was no perceptible rubbing of the fabrics against the smooth interior of the tub as distinguished from movement along that smooth interior;

(e) The fabrics moved outward from down between the blades of the impeller;

(f) The operations in these machines are incapable of statement in exact terms;

(g) Lint was present in the water after a period of operation of the machines in question, but that is not incompatible with the cleansing process of the Snyder patent. There was no comparison of the amount of lint found in the water of the Maytag machines with that found following the washing of the same materials in a peg dolly machine, and hence no conclusion can be drawn from the presence of lint in the Maytag type of machine.

22. The demonstrations of devices in open court asserted by defendant to correspond with the structures and operations of various prior patents failed to show anything that disclosed the invention of the Snyder patent or its claims in suit.

23. That because of the idiosyncrasies of individual technique, raiment, water, the degree of soil and its character, and the size and texture of the articles to

be cleansed there was no necessity for specifying in the Snyder patent or elsewhere the load of clothes that could be conveniently handled in the plaintiff's machine. Proper loading to obtain the results of the Snyder patented invention is a mere matter of experience and observation.

24. The patent is sufficiently clear and explicit with regard to speed of oscillation of the impeller. The patentee states the requirements of sufficient speed to accomplish the definite objects stated.

25. The testimony taken both by deposition and in open court, under an amendment to the answer made just prior to the trial, concerning alleged prior invention by Altorfer, fails to establish either anticipation of the Snyder invention or any date of reduction to practice of the alleged work by Altorfer prior to Snyder's reduction to practice. The Altorfer evidence is deemed insufficient to show more than desultory experimenting prior to Altorfer Brothers' knowledge of the Snyder-Maytag machine in 1922.

26. The testimony taken in open court shows that Snyder disclosed his invention to Frederick F. Mason on January 21, 1921, and that Snyder's reduction to practice preceded that date by several months.

27. Snyder had sufficient blade surface to impart outward force or throw of water and this was assisted by the dish-shaped disc. Many claims not in suit specify that form of disc, but Claim 23 does not specify it in terms or by implication. The reference to the "adjacent portion of the impeller base" in that claim means the inner portion as well as that near the rim. The same is true of Claim 26.

28. These claims are in harmony with the invention as described in the specification and the disclosure of the latter was sufficiently broad to support a claim

which did not embrace a dish-shaped disc exclusively, but a flat disc was equally within the conception as stated.

29. Claims 23 and 26 in suit are not shown to embody any expansion of concept beyond many of the claims stated in the original application. There is nothing in these claims in extension of the assertions in the application.

30. The method described in Claim 38 of the patent in suit is novel and there is no evidence to the effect that the method covered thereby could not be practiced in a machine of another design.

31. The method of Claim 38 of the patent in suit was considered in the interference proceeding of *Unruh* v. *Snyder,* 49 Fed. (2d) 1038. It there appeared that Snyder's method, Claim 1, was filed in July, 1924, more than two years after the application. All of the tribunals of the Patent Office and the Court of Customs and Patent Appeals held that this did not defeat Snyder's right to make the claim because the original disclosure was sufficient to sustain it. This Court agrees with that finding. The verbiage of said Claim 1 quoted in said decision is different from the verbiage of Claim 38, but the same method or process is equally embodied in both.

32. The Court's careful examination of the extensive Patent Office proceedings disclose nothing inequitable on the part of the plaintiff throughout these entire proceedings. It does not appear that plaintiff's presumptive rights have been impaired by any action or occurrence during those proceedings.

33. Further findings on specific points in addition to those herein mentioned will be found in the opinion of this Court filed on or about July 19, 1935.

Conclusions of Law.

1. The Court has jurisdiction of the subject matter and of the parties.

2. The title of the patent in suit is vested in the plaintiff and plaintiff may maintain suit to restrain infringement of it.

3. Letters Patent in suit No. 1,866,779, are good and valid in law.

4. Claims 23, 26 and 38 of said Letters Patent in suit have each been infringed by defendant subsequent to the grant of said patent, after notice and prior to the filing of the bill of complaint herein.

5. Plaintiff is entitled to a perpetual injunction restraining said defendant, its privies and employees and those in active concert or participating with them from infringing said claims, and to recover the profits and damages resulting from the infringement as determined by an accounting, together with the costs of this suit.

Mortimer W. Byers,
United States District Judge.

Dated: October 7, 1935.

IN THE

DISTRICT COURT OF THE UNITED STATES

WESTERN DISTRICT OF MISSOURI,

WESTERN DIVISION.

THE MAYTAG COMPANY,
A CORPORATION,
Plaintiff,

vs.

GENERAL ELECTRIC SUPPLY
CORPORATION (A CORPORATION),
Defendant.

} EQUITY No. 2892.

MEMORANDUM OPINION, FINDING OF FACT, CONCLUSIONS OF LAW, INDICATED DECREE.

The plaintiff is the owner of Letters Patent No. 1,866,779. In its amended and substituted bill it alleges that the defendant General Electric Supply Corporation, hereinafter referred to as the defendant (a motion to quash the service of process and to dismiss having been sustained as to the General Electric Company), has infringed plaintiff's patent and particularly claims 23, 26 and 29 thereof. That one of the several defenses pleaded in the answer which, under the evidence, merits consideration, is the defense of invalidity of patent as to the claims in issue. The challenge is that the patentee was not the original, first and sole inventor and discoverer, but that long prior to his application the patented machine and method were known and used by others in this and foreign countries.

That challenge is buttressed by the decree of the United States Circuit Court of Appeals for the Second Circuit in *Maytag Co.* v. *Brooklyn Edison Co. Inc.*, reported in 86 F. (2d) 625.

We realize that the District Court is but a conduit through which this case must pass on its way to an appellate tribunal, perhaps to more than one. Nevertheless, we should like to make some contribution to the final decision. Ordinarily we should hope to do that by an opinion. We are not willing, however, merely to repeat what another has said and has said better than we can say it. Judge Byers of the Eastern District of New York in *Maytag Co.* v. *Brooklyn Edison Co. Inc.*, 11 F. Supp. 743 (the Circuit Court of Appeals for the Second Circuit reversed the decree entered by Judge Byers in the case cited *supra*), wrote an elaborate, carefully wrought, artistic (we use the word advisedly) opinion, which we can do no better than adopt. That case and the case here substantially are identical.

The Second Circuit Court of Appeals reversed the District Court for the Eastern District of New York upon the theory that plaintiff's patent had been anticipated by various inventions. That was claimed here. The earlier contrivances, relied on by the Court of Appeals, and others, were exemplified to us by models and by actual machines. As each was operated the operation was accompanied by the testimony of a learned professor. Listening to his testimony alone (or reading it in the record) one would be forced to conclude that plaintiff's patent was an exact replica of several earlier machines. Only when the observer withdrew his gaze from the lips of the professor and observed the machines whose operation he purported to be describing did he realize that the professor's words did not

accurately describe the earlier machines and their operation

The truth is that these earlier contrivances **did not work** from a practical viewpiont and certainly not in the way disclosed in claims by Snyder. The plaintiff's machine **did work,** most successfully. And defendant's device is a plain infringement.

If the learned Circuit Court of Appeals for the Eighth Circuit contents itself with the printed record it is likely that it will follow the Second Circuit. If it permits the same demonstrations which we saw (and which, so it was said at the trial, the Second Circuit Court of Appeals refused to see), it may reach a different result. In the suggestion that it do that is our contribution to a just decision.

Findings of Fact and Conclusions of Law.

Learned counsel for plaintiff have submitted requested findings of fact and conclusions of law which are filed contemporaneously with this opinion and which are adopted by the Court as the Court's findings of fact and conclusions of law. The findings of fact are numbered 1 to 28, inclusive. The conclusions of law are numbered 1 to 10, inclusive.

To each of the conclusions of law adopted by the Court as the Court's conclusions of law, the defendant is allowed an exception.

The defendant has submitted to the Court requested findings of fact and conclusions of law. They are filed contemporaneously with this opinion. The requested findings of fact are from 1 to 40, inclusive. The requested conclusions of law are from 1 to 4, inclusive.

To the Court's refusal to give each conclusion of law requested by the defendant, the defendant is allowed an exception.

Indicated Decree.

Counsel for plaintiff promptly will prepare and submit a form of decree in accordance with the foregoing findings of fact and conclusions of law and providing for the appointment of a master to take testimony on the subject of damages.

MERRILL E. OTIS,
District Judge.

IN THE

DISTRICT COURT OF THE UNITED STATES,

WESTERN DISTRICT OF MISSOURI,

WESTERN DIVISION.

The Maytag Company, a Corporation, Plaintiff,

vs.

General Electric Supply Corporation (a Corporation), Defendant.

} Equity No. 2892.

FINDINGS OF FACT AND CONCLUSIONS OF LAW.

The issues in this suit having duly come on to be heard by the Court, commencing November 29th and ending December 4th, and the proofs, arguments and briefs of plaintiff and defendant having been duly considered and due deliberation having been had, I hold and find as follows:

Findings of Fact.

1. Plaintiff, The Maytag Company, is the sole owner of the Snyder patent in suit, No. 1,866,779, issued to it July 12, 1932, claims 23, 26 and 29 of which are here asserted. Plaintiff has its principal place of business in Newton, Iowa, where it has been engaged continuously since early in 1922 in the manufacture

and sale of washing machines embodying and utilizing the invention of said Snyder patent. Specimens of these machines are in evidence as Plaintiff's Exhibits 9, 10 and 11. These machines have been extensively sold and used throughout the United States.

2. Defendant, General Electric Supply Corporation, is a corporation organized and existing under the laws of the State of Delaware, having an office and regular and established place of business in Kansas City, Missouri, within the Western Division of the Western District of Missouri.

Subsequent to notice of infringement of the Snyder patent and between its issuance on July 12, 1932, and before the filing of this suit, defendant sold from its place of business in Kansas City, General Electric Washing Machines, "Model AW19 and other models," (see Answer, paragraph 6, and paragraph 4 of stipulation, R. 76).

Defendant's washing machines are illustrated in evidence by one of these machines, Plaintiff's Exhibit 12, by the drawings, Plaintiff's Exhibits 12a and 12b, and in the General Electric Company's circulars and advertisements, Plaintiff's Exhibits 16, 16A, 16B, 16C, 16D, 16E, and 16F. It is stipulated that these circulars and advertisements were published or issued and caused to be distributed by the General Electric Company for use in promoting the sale of its washing machines since January, 1931. (R. 76.) They relate to the General Electric Company washing machines here in controversy as all of the washing machines made by it and sold by defendant operate on substantially the same plan and construction. The statements made in these advertisements and circulars "apply to all of them" (Defendant's witness Bobst, R. 486-487).

3. The General Electric Company's machines sold by the defendant employ and utilize the invention of the Snyder patent, and operate in substantially the same way as the Maytag machines made thereunder by plaintiff. This appears from comparison of the Snyder patent drawings, its specification and claims here in suit, the Maytag machines, Plaintiff's Exhibits 9, 10 and 11, and the defendant's machines supplemented by the testimony. In each:

(*a*) The tub has a smooth interior surface free from rubbing projections.

(*b*) The rotary reciprocatory impeller is mounted in the tub adjacent its bottom.

(*c*) The impeller has a base and a plurality of blades, each of which is of substantial height and lateral area, as shown in the Snyder patent drawings. It is important to have them thus constructed to secure the water action contemplated by Snyder. The effective water impelling area of these blades is substantially the same in each of these machines (R. 249).

(*d*) The impeller has a central portion projecting upwardly from the center of the base in which the drive shaft is fixedly mounted.

(*e*) The upper surface area of the base is considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion. [In the Snyder machine with a 22 inch tub, the impeller is 12.7 inches in diameter and defendant's machine with a 22 inch diameter tub, the impeller is 13 inches in diameter.] (R. 271.)

(*f*) The margin of the base of the impeller is spaced a substantial distance away from the upwardly extending portion of the tub (R. 224). This distance is substantially the same in the Snyder patent drawings, the Maytag machines made thereunder, and in defendant's

machines, and is important in securing roll-over of the clothes and keeping them well distributed throughout the tub as they are driven about by the violent water currents created by the impeller.

(*g*) There is a rotary reciprocating drive shaft extending upwardly through the bottom of the tub into the interior thereof for supporting the impeller for movement in a fixed plane.

(*h*) There is a power means, including a pinion on the drive shaft, a rack bar cooperating therewith and a motor mounted beneath the tub, for rapidly reciprocating the shaft and impeller.

(*i*) The construction, positioning and arrangement of the impeller with respect to the tub is such that each blade of the impeller and its adjacent portion of the impeller base when rapidly reciprocated will simultaneously drive the cleansing fluid in one and then an opposite outward upward circulatory direction toward and around the clothes, and act in cooperation with the interior of the tub to cause violently flowing opposed currents of liquid to meet and flow inwardly and downwardly toward the central portion of the tub, and substantially suspend the materials in the fluid while being washed, in accordance with the teachings of the Snyder patent.

Plaintiff's demonstrations before the Court of the Snyder invention as embodied in the Maytag gyrator machine, both in a glass sided tub and in plaintiff's commercial machines, showed that the clothes being washed were driven about in the tub and substantially suspended, as depicted in the Snyder specification and claims here in suit, by the violent water currents created by the impeller as it was rapidly oscillated back and forth at the bottom of the tub. The clothes were placed in the tub, piece by piece, and were first drawn

downwardly, then forced outwardly, upwardly and inwardly, first in one and then in the opposite direction, and kept well distributed throughout the tub, without braiding, and acted upon as individual pieces as they were rolled over and over, by the vigorous rapidly moving water currents created by the impeller.

In these demonstrations the machines were operated in a manner described by plaintiff's witnesses and in accordance with the directions issued by plaintiff and the General Electric Company in connection with the sale of their respective machines, and were so loaded that the clothes were "turning over freely in the water." (Pl. Exs. 16B and 11E.)

Among the clothes washed in these demonstrations were fragile lace curtains, a variety of towels and a pair of dirty overalls. These articles were washed in a few minutes (little over 1¾ minutes for the lace curtains [R. 735], 6¾ minutes for a load of towels [R. 738] and 11 minutes for the overalls [R. 756] without apparent injury to any of them. When the machines were thus loaded the washing was done largely by the violent water action, by which the clothes were flexed, rolled over and over and kept well distributed throughout the tub.

That the machine of the Snyder patent, the Maytag machines made under it, and defendant's machines, are intended to and do operate in substantially the same way, is shown by the demonstrations of plaintiff's machines before the Court, by the statements of plaintiff's witnesses, by the General Electric circulars (Pl. Exs. 16, 16A, 16B), and by the testimony of defendant's expert witness, Taggart (R. 411, 412).

4. Previous to the Snyder invention, commercial washing machines generally were of the following types:

(*a*) Scrub or Rubboard.
(*b*) Dolly.
(*c*) Oscillator.
(*d*) Cylinder.
(*e*) Vacuum Cup.

In each of these types of machines the washing was done by mechanical means which rubbed, scrubbed, pounded, squeezed, compressed or dragged them around in the tub as a mass, in simulation of the manner in which clothes have for years been washed by housewives on the old-fashioned washboard.

Each of these types of machines were slow in operation, did not satisfactorily clean the clothes, the more dirty parts of which had frequently to be washed by hand on the old-fashioned washboard even after the long rubbing operation in the tub. In each of these machines, and especially with the peg dolly type, which was by far the most extensively used, there was ever present the danger of injury to the clothes and more delicate fabrics could not be washed with them without mutilation.

The difficulties incident to the operation of these machines and the ever present detriment to the clothes washed in them, had long been recognized generally and by Snyder for years prior to his invention. The evidence of Snyder's and plaintiff's experience with the dolly and cylinder types, and the prior patents before the Court, show the struggle to improve the operating mechanisms of these various types of machines since 1809, but this did not relieve the difficulties inherent in the use of these old types.

5. Snyder well recognized the difficulties incident to and inherent in each of the old types of machines, and it was only after discarding completely the manner in which clothes were washed in them that he over-

came the struggle for a successful machine which would wash rapidly, cleanly and without detriment to the clothes, and largely by water action, as distinguished from rubbing, scrubbing, pounding, squeezing, compressing and dragging the clothes much as they were rubbed on the old-fashioned washboard.

Snyder, in devising the machine depicted in his patent drawings, specification and claims, had its parts so constructed, arranged and operated as to carry out his new manner of washing. These are embodied in the Maytag machines made under his patent and in defendant's machines.

6. As a result of Snyder's numerous experiments commencing in May of 1920, plaintiff put upon the market his new washing machine in February, 1922, and abandoned the sale of its previous peg and other dolly and cylinder type machines. For several years thereafter plaintiff enjoyed an exclusive field in the sale of these machines, despite the skepticism of dealers, housewives, the public generally, and the derision of competitors who were selling the old type machines in competition with it.

7. Through demonstrations in homes and elsewhere, dealers and housewives became convinced of the superiority of the Snyder machine over previous types, that it would wash clothes in much less time than any of the previous types and without injury to them, and bought them at a higher price than the old types sold for.

8. Due to the inherent advantages of the Snyder invention as embodied in the plaintiff's machines, and the demonstrations and sale of them throughout the country, they have come to be recognized as a distinct type, now known as the "Gyrator type."

9. The Snyder patent was issued after very careful

examination by a number of primary examiners, law examiners, members of the Appeal Board and the Court of Customs and Patent Appeals, during the pendency of the application for the Snyder patent, and its issuance was delayed for over six years by a vigorously contested interference proceeding resulting in a decision in Snyder's favor by the Court of Customs and Patent Appeals (*Unruh* v. *Snyder,* 49 F. (2d) 1038).

10. During the prosecution of the Snyder application the skilled Examiners of the Patent Office had under consideration all of the patents here relied upon by the defendant except the merely cumulative Hermance and Runkel patents, and granted the patent with full knowledge of each of these. This strengthens the usual presumptions arising from issuance of the patent.

11. "The consideration given the Snyder invention and application by the various tribunals of the Patent Office and the Court during these [interference] proceedings and the unusual strain and stress of this searching process strengthens the usual presumption arising out of the issue of a patent." (Judge Byers' Finding of Fact 16.)

12. The General Electric Company sold the plaintiff company motors for use on its Gyrator machines made under the Snyder patent during the entire period from 1922 until the end of 1930 (R. 193-4). Its engineers and other representatives became thoroughly familiar with these Maytag machines through visits to The Maytag Company plant and its experimental department during this period. This was until shortly before it first appropriated the Snyder invention and placed it upon the market in the form of the machines here charged to infringe. Since that time the General Electric Company has claimed for its washing machine

sold by defendant the same inherent advantages and method of operation depicted in the Snyder patent.

13. The machine of the Snyder invention has had an unusual commercial record, plaintiff having sold approximately three million machines utilizing it (R. 187).

14. The specifications and claims of the Snyder patent here in suit are sufficiently full, clear, concise and exact when read in connection with the plain disclosure of the drawings as to enable anyone skilled in the art to manufacture it and to make it operate in accordance with the teachings of that patent.

15. Defendant's answer sets up nine United States, two British and one French Letters Patent, and three alleged prior uses (two by the 1900 Corporation, of Binghamton, New York, and one by Miller Manufacturing Company, Meyersdale, Pennsylvania) to invalidate the Snyder patent.

"None of the prior patents, or alleged prior uses relied upon by the defendant show or disclose a washing machine," construction, arrangement of parts or manner of operation disclosed in the Snyder patent drawings and described in his specification and claimed in the claims here in suit, or "any which negative the patentable novelty of any of these claims."

16. Claims 23, 26 and 29 of the Snyder patent, when read in connection with the drawings and specification, are each limited to an impeller mounted for fixed movement and at the bottom of the tub, to the combined structural elements shown in the drawings and referred to in the specification or their equivalents and to the operation described. When thus read they are not anticipated and include within their proper scope defendant's machine.

17. Defendant's expert selected "the Doughty and

Davis, the Jardine, the Davis, perhaps the Henin and Hermance," as most closely approaching the described operation of the Snyder patent, and the Davis and Jardine patents as most closely approaching the Snyder construction (R. 430, 433).

The Davis Patent and the Machines Made Under It by the 1900 Company.

18. Defendant took the depositions of a number of witnesses now or formerly connected with the 1900 Company, of Binghamton, New York, relative to the construction and operation of these machines, made and sold by that company between the year 1918 and the time when they were abandoned in 1921 or 1922.

The machines made under the Davis patent are known as the 1900 Company's Forms 1, 2 and 3 machines. They all operated in the same way. (Dep. Behan, pp. 221-224.)

Defendant's witnesses Doughty, Behan, Quinn and Davis were familiar with the construction and operation of these machines at the time they were being sold by the 1900 Company. Their testimony conclusively shows that this machine was substantially identical with the structure of the Davis patent and with that of the old rubboard type of machine on the market previous to 1922 and long since abandoned (Dep. Behan, pp. 221-222). In these machines made under the Davis patent, the entire interior or bottom of the tub was corrugated so that the clothes could be rubbed against these corrugations as a mass. The cover was pivotally mounted at one side of the machine so that it could be opened and closed with respect to the tub (Dep. Doughty, p. 175; Behan, p. 222). A square shaft was **slidably** mounted through the center of this cover. A

rubboard, having twelve radially arranged cleats extending from its outer periphery toward its center, each of which was approximately 7/8 inch high (Dep. Doughty, p. 194), was secured to the lower end of the slidable shaft and moved up and down with it. **This rubboard was of substantially the same diameter as the interior of the tub.** In its lowermost position the rubboard was about an inch above the bottom of the tub. Immediately adjacent the cover hinges a motor driven gearing was mounted, whereby the rubboard could be oscillated in the tub when the cover was closed.

The testimony of defendant's witnesses shows that when the clothes were placed in the tub and the cover closed, the rubboard **slid down into contact with the clothes** (Dep. Dought, pp. 171-172; Behan, p. 223), that immediately upon the rubboard starting to work, its oscillations and movement of the water incident thereto caused the **slidably** mounted rubboard **to descend into close contact** with the upper surface of the **mass of clothes** and **compressed them** between the rubboard and the corrugated interior of the tub (Dep. Doughty, pp. 171-179); and that the clothes were washed by rubbing action of the rubboard and the rubbing of the mass against the corrugated interior of the tub (Dep. Doughty, p. 171; Behan, p. 223). There was poor circulation of clothes, practically none when the machine was ordinarily loaded (Doughty, p. 178).

Defendant's witness Doughty testified that the machine shown in the patent drawings in actual practice would not create the currents described in the Davis patent, for when the rubboard settled down into the clothes the currents described in the patent would disappear (Dep. Doughty, p. 201).

Mr. Doughty confirms his testimony as to the operation of these machines by his letter written Mr. Clark

on March 23, 1921, where he states of the Davis machine that its action—

> "causes the agitator to **sink** in the water and **restrict the free movement of the clothes,**"

and that (Dep., p. 179)—

> "The vanes on the agitator when in motion cause the water to flow from the center toward the side of the tub. Consequently, the center is lowered and the agitator, which is only held in position by floating upon the water, or by the supporting effect of the clothes, **is drawn down with the result of compressing the clothes, restraining their free movement and increasing the power required to operate the washer.**"

Mr. Doughty also testified that in operating the Davis machine the clothes remained in a "state of rest at the center of the tub."

The evidence shows that at the time these machines were being sold the manufacturers stressed the large quantity of clothes that could be handled in a single batch (Dep. Doughty, p. 186; Behan, pp. 235-236).

In referring to the Davis patent, defendant's witness Doughty said that the machine shown in it would not in actual practice create the currents described in it except when the agitator was held up from decending (Dep. Doughty, p. 201).

Defendant's expert Taggart says with respect to this machine that the clothes are washed, if at all, by rubbing, pounding, squeezing and dragging (R. 446).

Defendant's expert demonstrated one of these machines without any clothes in it, before the Court, and stated that the rubboard would remain at the top of the water in operation and not descend into the clothes, in the face of testimony of defendant's witnesses to the contrary. Plaintiff later made a demonstration be-

fore the Court of two of these machines, one with water only in the tub and the other with a load of clothes in it. In these demonstrations in the machine with only water in it the rubboard moved from its upper limit of movement adjacent the cover to its extreme lower limit of movement, which the evidence shows was about an inch above the bottom of the tub, in less than a minute (R. 748), and in the machine loaded with clothes it went down to within one inch of its lower limit of travel and compressed the clothes between it and the bottom of the tub in less than two minutes, and continued to operate in this position (R. 749-750).

The demonstration of these machines by plaintiff, considered in connection with defendant's own witnesses and the statements made by Mr. Doughty in his letter to Mr. Clark of 1921, shows that in the operation of the machines of the Davis patent the clothes are compressed and rubbed as a mass between the slidably mounted rubboard and the bottom of the tub, and that the clothes are washed in it by the rubbing action of the rubboard and the rubbing of the mass against the corrugated interior of the tub, and in a manner radically different from that described, disclosed and claimed in the Snyder patent.

That the machine shown in the Davis patent will **not** operate or wash clothes in a manner described in its specification, is further shown by the testimony of defendant's fact witnesses, by plaintiff's demonstrations of these machines before the Court, and by the testimony of plaintiff's and defendant's experts. (See Taggart, R. 446; Kenerson, 760-773.)

The construction of the Davis machine with its rubboard slidably mounted in the cover of the machine of substantially the same diameter as the interior of the tub, with its low rubbing cleats, and its operation

of compressing and rubbing the mass of clothes between the rubboard and the corrugated interior of the tub with little circulation of water, is radically different from the construction and operation of the machine of the Snyder patent drawings, description and claims in suit, in which the tub has a smooth interior, an impeller mounted for oscillation in a fixed plane at the bottom of the tub, a base for the impeller of substantially less diameter than the interior of the tub, equally spaced blades on the impeller of substantial height and lateral area projecting **upwardly** therefrom, and a mechanism for operating the impeller at high speed mounted beneath the tub whereby the clothes are washed largely by water action, rolled over and over, kept well distributed throughout the tub in untangled condition and acted upon as individual pieces by the vigorous currents and cross-currents created by the impeller.

The Davis patent was before the various Examiners of the Patent Office who considered it not to disclose or anticipate the Snyder invention.

The Jardine British Patent.

19. This is another **dolly** machine. Its claims relate to mechanism for keeping the clothes from tangling beneath the dolly in the operation of the machine. This of itself indicates that this was a rubbing, pounding, squeezing and dragging type of machine, and defendant's expert so testified. (R. 435.)

The dolly of this machine is pivotally mounted on the bottom of the tub, and has its operating shaft extending **upwardly** therefrom without showing any mechanism for driving it. This dolly has a series of vertical ribs or projections b^2, b^2 throughout its entire height. It has a series of wide vertical ribs marked a^1, a^1 ex-

tending from the top of the interior of the tub to a point a short distance above the bottom.

There is not the slightest disclosure or suggestion in this foreign patent for operating the dolly either in a fixed plane or by a reciprocating mechanism mounted beneath the tub. There is no indication in the patent of so operating the dolly as to create velocity of water flow or a vigorous water action or indeed any water action. There is nothing which suggests whether the dolly is to be driven continuously in one direction or for a number of revolutions in one direction and a number of revolutions in the opposite direction. There is no suggestion of any mechanism for reciprocating the dolly through the proper arc for creating vigorous rapid currents of water and the directional flows disclosed in the Snyder patent drawings, specification and claims here in suit. There is no suggestion of washing clothes while substantially suspending them in water by vigorous water action, or washing them largely by water action as distinguished from rubbing, pounding, squeezing, compressing and dragging them, as was done by the well-known **dolly** type machines of 1891 and subsequently. There is no suggestion or intimation in the patent that the vertical ribs on the interior surface of the tub have no functions and do not affect the washing operation. Their presence in the drawings and specification clearly indicates the contrary. There is nothing to indicate or suggest that the only rubbing that occurs is between the clothes and the agitator. The patent is entirely silent as to the character of driving mechanism to be used, whether by hand or otherwise, and no suggestion of any mechanism which could operate it at high speed.

Judge Byers, with respect to the disclosures of the Jardine British patent, well says:

> "One can read the Jardine patent closely and often and yet not find any teaching whatever of a device to perform the operation of washing according to what Snyder says he invented. Jardine's instruction was of a means to prevent the mangling of fabrics beneath the disc. The presence of the ribs in the tub, and the necessary squeezing of fabrics against them by the blades of the agitator, is too clearly indicated by this patentee to admit of misunderstanding."

The record is absolutely silent as to whether any of these machines were manufactured or sold.

At the trial, defendant's expert made a demonstration of a glass tub machine which he stated corresponded to the Jardine patent. An examination of this demonstration machine, and the testimony, shows that the dolly in it, instead of being **pivotally** mounted on the tub bottom and operated from the shaft at the top, as shown in the Jardine patent, was mounted for operation in a **fixed** plane on a shaft extending upwardly through the bottom of the tub, which projected into a bearing near the top of the dolly. There is nowhere disclosed in the Jardine patent a dolly shaft driven by a pinion mounted beneath the tub, or a rack operatively connected with the pinion by a motor for driving this shaft. In this machine the mechanism for keeping the clothes from tangling beneath the dolly, upon which Jardine secured his patent, was entirely eliminated.

This glass tub machine used in defendant's demonstrations radically changed the structure shown in the Jardine patent by eliminating the very feature upon which Jardine relied when securing his patent, eliminated the drive shaft which extended through the top of the tub, shown in the Jardine patent, reconstructed the drive shaft and the interior of the dolly upon which

it was mounted, extended this drive shaft through the bottom of the tub and operated it by a pinion, rack bar and motor mounted beneath the tub, none of which is either disclosed or suggested in the Jardine patent. With this reconstructed machine defendant's expert attempted to so operate it as to create the water action disclosed and described in the Snyder patent. The demonstration of a reconstructed machine is of little probative value.

Under the decisions in this circuit and the Supreme Court of the United States, the Jardine patent is not an anticipation of the Snyder invention.

The Jardine patent was before various Examiners of the Patent Office who considered it not to disclose or anticipate the Snyder invention.

The Miller Machines and Patent.

20. The testimony shows that the Miller machines relied upon as a prior use by the defendant were simply old-fashioned dolly machines with cleats used in place of the conventional pegs. In these machines, as in the Davis machine the dolly was **slidably** mounted so that it squeezed and compressed the clothes between the dolly and the corrugated interior or bottom of the tub and dragged the clothes back and forth as a mass.

The defendant's witnesses testified that the operation of these machines is disclosed in the Miller patent No. 738,560 of 1903 and in the Miller Manufacturing Company's circular. (Miller patent, Pl. Ex. 22; Miller circular, Pl. Ex. 21.) These as well as the testimony of defendant's witnesses show that the contemplated and actual operation of them is like the old dolly type machines, and that they do not operate in the manner disclosed, described and claimed by Snyder.

Hermance Patent No. 88,478 of 1869.

21. The Hermance patent shows a wash boiler intended to be put upon the stove for boiling the water with clothes in it. It has a vibrating wheel operated by hand crank above the top of the boiler. Clothes are placed on this wheel for stirring them while boiling them on top of the stove. The purpose of this is to stir up the clothes while they are being boiled preliminary to washing on the old-fashioned washboard commonly used in 1869. The clothes are laid upon the cleats or ribs b, b, of the wheel E, which supports them from the bottom of the tub and holds them up from the main body of the wheel so that the holes through the wheel will not be clogged.

There is nothing in this patent which suggests the construction or operation disclosed in the Snyder patent drawings, specification or claims here asserted.

Henin French Patent.

22. The drawings of this patent show a tub having a corrugated interior b. On the interior of this tub is an agitator of substantially the same diameter as the interior of the tub. There is just an operating clearance between its outer periphery and the adjacent interior of the tub. The lattice base of its agitator is made of slats with holes between them as in the ordinary lattice work used under house porches. Secured to the upper portion of this base are four radially arranged cleats. Intermediate of these cleats are four "beaters," ribs or vanes u, each of which has four large holes in it, which are of less width at their widest portion than the length of the cleats t. There is a connecting rod for oscillating the agitator, connected by a

shaft h′, driven by a crank e′, or by a motor through the pulley wheels n′ or o′. There is a hand crank on this machine to be used interchangeably with a power pulley mounted on the same shaft. There is nothing in this patent "to indicate that the machine is operated at a different rate of speed by hand or by power." (Taggart, R. 470.)

The specification states that the seesaw or oscillating movement of the agitator is to be one-third of the circumference of the tub in each direction. The specification says—

> "The dimensions of these pulleys (driving pulleys) are such that it is always possible to operate the apparatus by hand or motor, the belt or handle being removed, as the case may be."

Claim 4, which shows that the interior disc comprises cross-wooden slats, in combination with wings and ribs, for the purpose of preventing the batch of linen from being packed at the bottom of the tub, plainly indicates that the purpose of the disc, being of substantially the same diameter as the interior of the tub, is to prevent the clothes being washed getting beneath it as they are rubbed and scrubbed by the agitator and dragged against the interior corrugations of the tub in the washing operation, a difficulty always experienced in the rubbing type machines.

The purpose of the large openings in the Henin disc is to cause the clothes to be sucked into them and thereby more firmly grip the clothes as they are beaten and rubbed by the corrugated interior of the tub when they are placed between its corrugated interior and the beaters and above the lattice base.

The Henin patent was considered by the Patent Office (see letter March 24, 1932), and by it held not to

anticipate the Snyder invention depicted in claims 23, 26 and 29 here asserted. It does not disclose the Snyder invention.

The Doughty and Davis Patent No. 1,496,305, Issued June 3, 1924, and the 1900 Form 4 Machine Made Under It.

23. In the machine shown in the Doughty and Davis patent and as embodied in the Form 4 machine made under it, there is an agitator or rubboard of substantially the same diameter as the interior of the tub mounted at its bottom for oscillation. There is just enough clearance around the circumference of the rubboard to permit it to operate on the interior of the tub. On the upper surface of the rubboard there are six equally spaced triangular rubbing cleats, approximately seven-eighths (7/8") inch in height, grouped about one side of the rubboard base and a wide space left between the nearest two on the opposite side of the base. This rubboard was operated at the same speed as the rubboard machine of the Davis patent (forty oscillations per minute). The testimony of defendant's witnesses shows that this machine was made to overcome the difficulties incident to the use of the machine of the Davis patent, in which the agitator sunk in the water and restricted the free movement of the clothes, and in which the agitator was "drawn down with the result of compressing the clothes" and "restraining their free movement." (Doughty, pp. 178-179.)

Mr. Doughty eliminated the symmetrical arrangement of vanes of the Davis rubboard and arranged his unsymmetrically. He states his reason (Patent, p. 2, line 11):

"The purpose of so arranging the vanes is that

> we have found that if the agitator surface is symmetrical there is a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing."

He also states that with symmetrically arranged vanes of the Davis patent there is a tendency—

> "to stretch the most available piece of laundry over the surface of the agitator and keep it there."

He further says (p. 2, line 29):

> "We have discovered, however, that by **arranging the agitator unsymmetrically the equality of the currents** is disturbed and as a result the piece of cloth in contact with the agitator **will not be retained** there but **will be moved off to one side** of the unequal currents acting upon it."

There is nothing in this patent to suggest or intimate the vigorous flow or action of the water or substantial suspension of the clothes in the water while the washing operation is going on. Mr. Doughty testifies that the purpose sought in the unsymmetrical arrangement of the blades was—

> "to cause the clothes to be operated on **in an irregular** manner and prevent them from remaining in a state of rest at the center of the tub" (Dep. Doughty, p. 180).

And in the use of the unsymmetrically arranged vanes there was

> "a **more or less** quiet zone in the washer created by the lack of the vanes"

and that the **outflow** between the widely spaced vanes **was less** than that at other points, so that it made a **less movement of the water** at the place affected by this wide separation of vanes.

Mr. Doughty testified that the 1900 Company advocated washing as many clothes in these machines as they would hold when washing them, and that it was the general tendency at that time to stress the large quantity of clothes which could be handled in a single operation (Dep., p. 186).

The fact that the rubboard of the Doughty and Davis machine is of substantially the same diameter as the interior of the tub, that it has low rubbing cleats about seven-eighths (7/8") inch high, unsymmetrically arranged for the purpose of obviating the difficulties which are said to be present if used with equally spaced rubbing members, such as disclosed in the Davis patent and that these machines were operated at slow speed, shows that it neither embodied the structure nor utilized the operation disclosed, described and claimed in the Snyder patent.

This machine was abandoned by the 1900 Company after it had made approximately 700 of them (a little more than a day's output for that factory). Defendant's expert testifies with respect to this machine that:

> "In that machine clothes are pounded, rubbed, dragged and squeezed in the washing operation" (R. 436).

Following its substantial abandonment in 1922, the 1900 Company carried on a large number of experiments with the Maytag gyrator machine in their experimental department, and finally adopted and has sold hundreds of thousands of its gyrator type machine shown in Defendant's Dep. Exhibit 12 (now part of Deft.'s Exhibit 38), (Dep. Doughty 193), under license of the Snyder patent.

Davis testified, with full knowledge of the gyrator type machine made under the license of the Snyder patent, that the 1900 Company is **not manufacturing any**

machines like its Forms 1, 2, 3 and 4 machines at the present time (Dep., p. 111). (In connection with this Finding, see Judge Byer's Opinion, page 3425, in Pl.'s Ex. 34.)

The Snyder washing machine with its impeller having a base of substantially less diameter than the upper portion of its tub and having blades of substantial height and lateral area and operating this at high speed to impel the necessary amount of washing fluid so vigorously and in such a manner as to substantially suspend the clothes by the water action while washing them, is clearly distinguished from the structure and disclosed operation of the Doughty and Davis machine.

24. The other patents set up in defendant's Answer and the two additional ones offered in evidence by defendant to show the state of the art (Marchand and Foster & Garrison) add nothing to the art already discussed and do not disclose the Snyder invention.

25. A machine purporting to represent the Morse patent was exhibited by defendant's expert at its demonstration. It was the machine which had a handle above each side of the tub for swinging its rubboard member. Defendant's expert said in referring to this machine that the housewife would prefer to use the old-fashioned rubboard or washboard for washing,—"The labor would be less" (R. 373).

26. In the defendant's demonstrations there was little attempt to operate the Snyder or defendant's machine in the manner described and claimed in the Snyder patent and in the General Electric advertisements and circulars. Instead the defendant attempted to show that these machines did not thus operate. The Court was unable to see in defendant's demonstrations many of the actions described by defendant's expert in connection therewith.

27. The testimony taken in open court of the witnesses Bradt, Miller, Stephan, Mooar, Thornton and Mason establish the fact that Snyder reduced his invention to practice in a wooden tub machine, made by Miller under his direction, in May of 1920. The evidence also establishes that this machine was successfully operated in May, 1920, to carry out the Snyder invention in the experimental department of The Maytag Company; that during the latter part of May and immediately following it was used successfully to wash clothes at the home of a washer-woman by the name of Mrs. Ellingsworth, in Newton, Iowa; and that Snyder also fully disclosed the invention to these witnesses during May of 1920 and to Mr. Mason on January 21, 1921, and subsequently. After making this machine, Mr. Snyder carried on a series of experiments with his invention.

Before October 1921 Mr. Miller, at Snyder's request, revamped one of The Maytag Company's Model 70 aluminum tub dolly type machines. He incorporated in it an impeller substantially like that shown in the Snyder patent drawings and operated it by a shaft extending downwardly through the bottom of the tub. This shaft was driven through a pinion and rack bar from a power leg taken from the Model 70 machine by a motor also mounted beneath the bottom of the tub. This machine (Pl. Ex. 8a) was used for washing clothes at Mrs. Ellingsworth's place in October 1921, in the presence of a number of witnesses and resulted in Snyder's securing the consent of Mr. Fred L. Maytag, President of The Maytag Company, and its Board of Directors, to proceed with the manufacture of these machines for sale. This was followed by the completion of four of these machines made in close resem-

blance to the Snyder patent drawings. Sales of these machines immediately followed. Plaintiff has since that time sold only this type of machine. It has abandoned its previous old types.

Snyder's reduction to practice and use of his invention in May of 1920 was more than eight months before the earliest date claimed by defendant for the disclosure or use of the 1900 Company's Form 4 machine made under the Doughty and Davis patent. The Doughty and Davis machines can not be used as an anticipation of Snyder.

28. Each claim of a patent is for a separate invention. The fact that plaintiff has filed a disclaimer as to claims 1 and 38 is no admission on the part of plaintiff that the claims disclaimed were anticipated or were invalid.

Claim 39 is for a separate invention from claim 38 in that claim 39 includes as part of its operation the step of causing the fabrics to be "freely moved about," whereas that step is not specified in claim 38. This feature of causing the fabrics to be freely moved about in order to evenly distribute them in untangled condition and rapidly roll them over is one of the distinguishing features of the claims here asserted.

Defendant contends that claim 20 is substantially identical with claims 23 and 26 held invalid in the Second Circuit. As the plaintiff is here asserting claims 23 and 26, there is no occasion for filing a disclaimer as to claim 20, and further because "no competent court has declared" claim 20 invalid (*Ensten case,* 282 U. S. 445, 449). Claims 20 and 39 are not in issue in this case.

Defendant's contention that the Snyder patent is invalid because the District Court in New York (Judge

Coxe), following the decision of the Court of Appeals, held claims 23 and 26 of the Snyder patent invalid in the Hurley and Easy cases, is without force for there is an appeal now pending from the decree of Judge Coxe and the plaintiff is still attempting to vindicate its position with respect to the Snyder invention in the United States Circuit Court of Appeals for the Second Circuit.

CONCLUSIONS OF LAW.

1. The Court has jurisdiction of the subject-matter and of the parties.

2. The title of the patent in suit is vested in the plaintiff and plaintiff may maintain suit to restrain infringement of it.

3. It is the duty of this Court to determine for itself the questions of validity and infringement of the Snyder patent here in suit, on the record before it, notwithstanding the fact that in a previous litigation between different parties the Court of Appeals of another circuit has held two of the claims in controversy invalid. In doing this it should and has given careful consideration to the decision of that court (*Triplett* v. *Lowell,* 297 U. S. 638, 644).

4. In considering the question of whether a foreign patent anticipates a patent in suit the—

> "foreign patent must disclose the invention in such full, clear, and exact terms as to enable any person skilled in the art to practice it without the necessity of experimentation." (*Donner* v. *Sheer Pharmacal Corp.,* 64 F. (2d) 217, 220, and cases there cited.)

5. An

> "invention or discovery relied upon as a defence, must have been complete, and capable of produc-

ing the result sought to be accomplished [by invention of the patent in suit]; and this must be shown by the defendant. The burden of proof rests upon him, and every reasonable doubt should be resolved against him." (*Coffin* v. *Ogden,* 18 Wall. 120, 124; *Cantrell* v. *Wallick,* 117 U. S. 689; *Drum* v. *Turner,* 219 Fed. 188 (C. C. A. 8).

6. Building up

"anticipation by changing and combining parts of structures of prior patents cannot be indulged." (*Wisconsin Minnesota Gas & Elec. Co.* v. *Hirschy Co.,* 28 F. (2d) 838, 841 (C. C. A. 8).)

7. The claims of a patent should be interpreted in the light of the drawings and specifications (*Eibel Co.* v. *Paper Co.,* 261 U. S. 45; *Ottumwa Box Car Loader Co.* v. *Christy,* 215 Fed. 362 (C. C. A. 8) and they should be so construed as to include the novel features and advantages inherent in the invention whether prescribed in the claims or not.

8. A disclaimer filed as to certain claims of a patent is no admission or confession on behalf of plaintiff that the claims disclaimed are anticipated or invalid, and so long as the patentee continues an attempt to vindicate his position with respect to any claims held invalid or with respect to other claims in the patent asserted, there is no necessity for filing a disclaimer.

9. Claims 23, 26 and 29 of the Snyder patent No. 1,866,779 are valid and infringed by defendant's washing machines in controversy.

10. Plaintiff is entitled to a perpetual injunction restraining said defendant, its privies and employes and those in active concert or participating with them from infringing said claims, and to recover the profits and damages resulting from the infringement as determined by an accounting, together with the costs of this suit.

UNITED STATES DISTRICT COURT,
WESTERN DISTRICT OF MISSOURI,
WESTERN DIVISION.

THE MAYTAG COMPANY, a corporation, *Plaintiff*, *vs.* GENERAL ELECTRIC SUPPLY CORPORATION, a corporation, *Defendant.* } In Equity No. 2892.

Decree.

This cause having been brought on for final hearing upon the pleadings and proofs, and after hearing arguments of counsel and considering briefs submitted on behalf of both parties, it is now FOUND, ADJUDGED AND DECREED:

First: That the patent in suit, being United States Letters Patent No. 1,866,779, dated July 12, 1932, for "Washing Machine," granted to Howard F. Snyder, as assignor to The Maytag Company, is good and valid as to the claims asserted (23, 26 and 29) and is the property of the plaintiff; that said Letters Patent in respect to all the claims included in the charge of infringement, being claims 23, 26 and 29, has been infringed by the defendant, the General Electric Supply Corporation, a Delaware corporation, having an office and an established place of business at Kansas City, Missouri, within the Western Division of the Western District of Missouri and elsewhere, by the use and sale of washing machines known as General Electric washing machines, "model AW 19 and other models" (illus-

trated in evidence by Plaintiff's Exhibits 12, 12a, 12b, 16, 16A, 16B, 16C, 16D, 16E and 16F).

Second: That a perpetual injunction issue in due form of law against said defendant, the General Electric Supply Corporation, enjoining it and those in privity with it, their officers, agents, servants, employees and attorneys and those in active concert or participating with them and each of them, from directly or indirectly manufacturing, selling, using, advertising or offering so to do, any washing machine or part thereof infringing claims 23, 26 and 29, or either of them, of the Snyder patent No. 1,866,779, dated July 12, 1932, or any device embodying or utilizing the same, and particularly General Electric washing machines, "model AW 19 and other models" (illustrated in evidence by Plaintiff's Exhibits 12, 12a, 12b, 16, 16A, 16B, 16C, 16D, 16E and 16F), and from in any respect infringing upon said Snyder patent or aiding or abetting or in any way contributing to the infringement thereof.

Third: That the plaintiff recover of defendant the profits, gains, savings and advantages which it has derived by reason of the aforesaid infringement and the damage which the plaintiff has sustained by reason of said infringement; that this cause be referred to Kenneth Fligg, as Master of this court, to take and state an accounting of said profits, gains, savings, advantages and damages and assess the same, and report thereupon pursuant to the statutes and the equity rules in such cases made and provided.

Dated: Feb. 8, 1938.

(Sgd.) MERRELL E. OTIS,
United States District Judge.

A. D. 1891. Oct. 23, No. 18,202.
JARDINE'S Complete Specification.

(2 SHEETS)
SHEET 1.

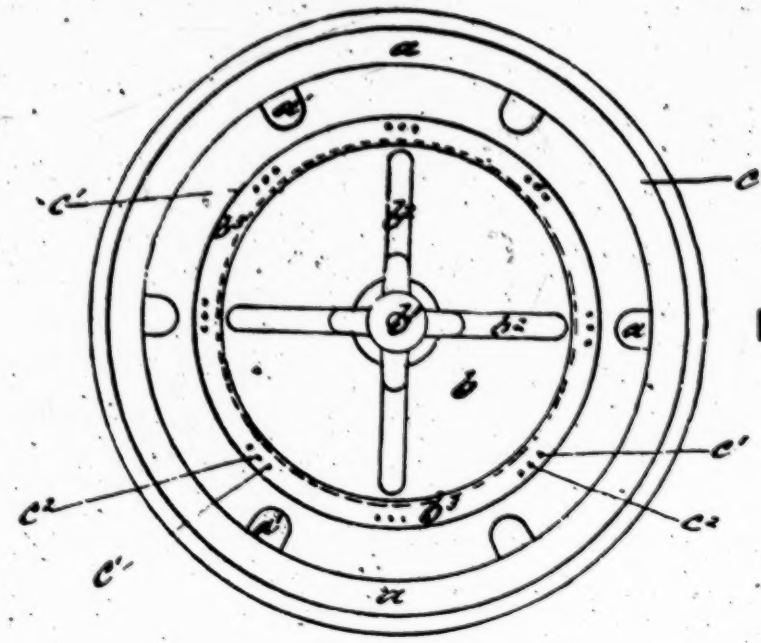


Fig. 1.

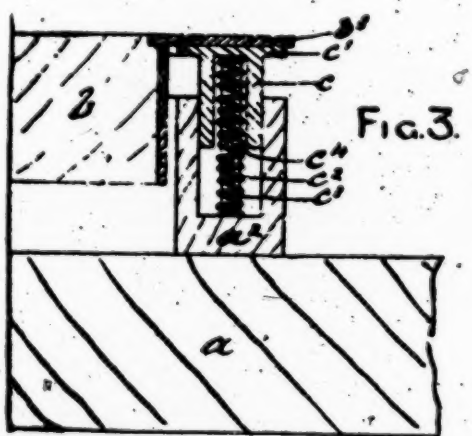


Fig. 3.

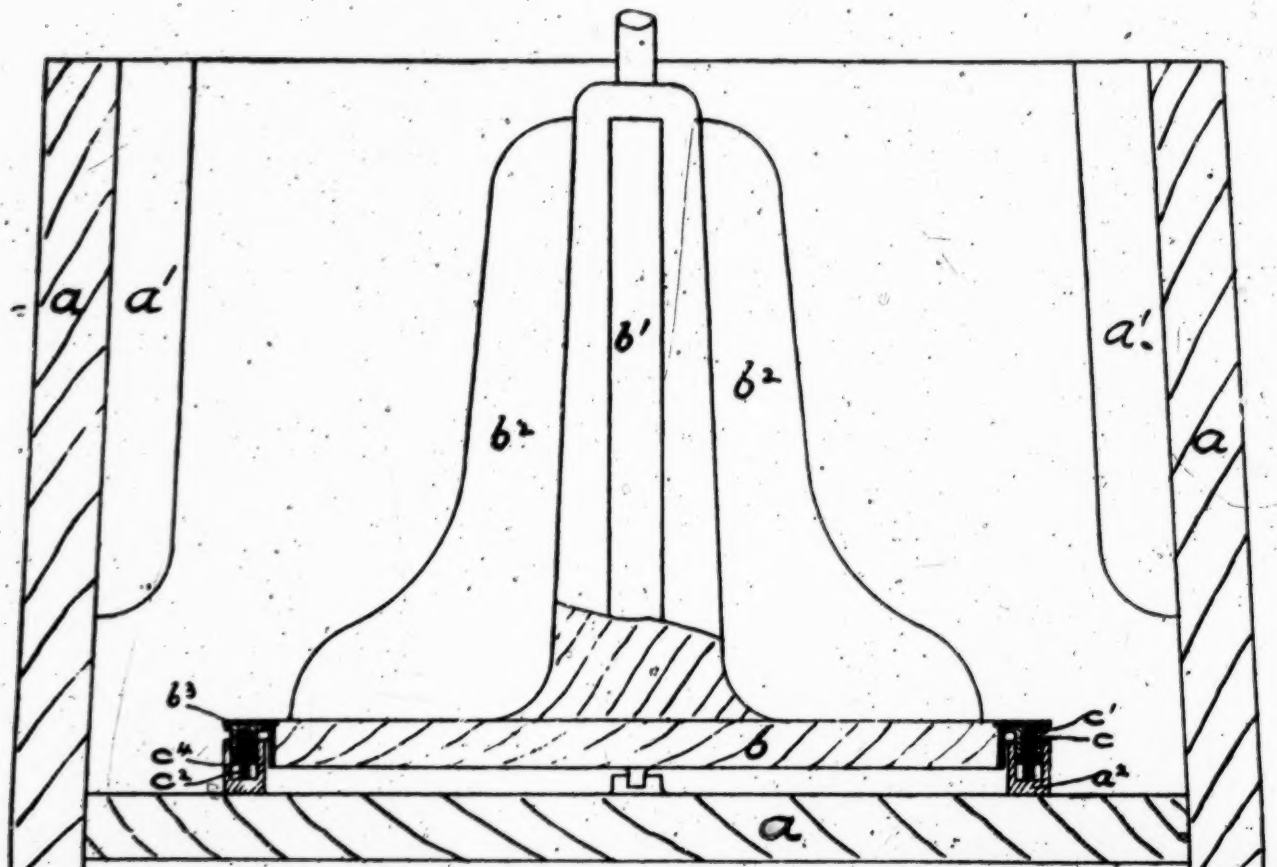
London, Printed by Darling and Son Ld.
for Her Majesty's Stationery Office. 1892.

(This Drawing is a reproduction of the Original on a reduced scale.)

FIG. 2.

SHEET 2.

47



Malby & Sons, Photo-Litho.

N° 18,202 A.D. 1891

Date of Application, 23rd Oct., 1891
Complete Specification Left, 21st July, 1892—Accepted, 1st Oct., 1892

PROVISIONAL SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention to be as follows :—

My invention relates to machines employed in the cleansing of linen cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly.

In order to prevent such damage I employ a horizontal ring set and bolted into a groove in the bottom of the machine and furnished with perpendicular pins and springs which support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of the hoop or rim with sockets into which the pins pass so as to prevent the movement of the hoop or rim in a lateral direction.

The springs keep the flanged or tongued hoop or rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleansed to be caught in and damaged by.

I may, however, keep the flanged or tongued hoop or rim in position by other means than perpendicular pins.

Dated this 22nd day of October 1891.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

COMPLETE SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

My invention relates to machines employed in the cleansing of linen, cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly and is specially applicable to machines consisting of a circular tub or vessel with vertical ribs or projections on its inner surface and of a dolly composed of a disc with an elongated boss or centre carrying projecting ribs and caused to rotate in each direction alternately and reciprocally.

In order to prevent such damage as I have mentioned I employ a horizontal stationary ring set into a groove in the bottom of the machine and furnished at intervals with perpendicular pins and springs which stay or control and support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of this hoop or rim with sockets into which the perpendicular pins pass so as to prevent the movement of the hoop or rim with the dolly in a lateral direction.

The springs keep the flanged or tongued rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleaned to be caught in and damaged by, while the elasticity of the supports of the stationary hoop or rim allows it also to adjust itself to variations in the vertical position of the dolly.

[*Price 8d.*]

In constructing my improved machine for practical use I have made some modifications in my arrangements which I prefer. According to these modifications, instead of placing the dolly above the horizontal ring and flanged or tongued hoop or rim, I enclose it within them and furnish it, on its upper surface, with a horizontal projecting circular flange against the under surface of which the flanges or tongues of the hoop or rim is pressed into close contact by means of the supporting springs so as to form a close fitting joint between them.

This hoop or rim is provided on the under surface with cavities or sockets to receive the perpendicular pins and springs which are fixed in a grooved or flanged horizontal stationary ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued hoop or rim. I may employ additional springs at intervals independently of the perpendicular pins and the hoop or rim may be slotted, grooved or perforated between the pins and springs for the purpose of making it lighter.

And in order that my said invention may be more fully understood I shall now proceed to refer to the figures and letters upon the several sheets of drawings hereunto annexed the same letters of reference indicating the same or corresponding parts of my improved washing machine throughout all the figures.

Fig. 1 is a plan of a circular washing machine with vertical ribs and a dolly having an elongated boss or centre with projecting ribs and it shows the disc provided with a horizontal projecting circular flange, the rim of the disc or base being indicated by a dotted line on the flange. The positions of the perpendicular pins and springs are indicated by small circles also on the flange.

Fig. 2 is a cross section of the same machine and dolly which shows the horizontal projecting circular flange on the upper surface of the disc or base of the dolly, the hoop or rim with its flanges or tongues in contact with the under surface of the horizontal projecting circular flange and furnished with sockets to receive and stayed or controlled and supported by perpendicular pins and springs fixed in a grooved or flanged ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued hoop or rim and

Fig. 3 is an enlargement in section of the periphery of the dolly's disc or base, the horizontal projecting circular flange, a cavity or socket in the hoop or rim and the grooved or flanged ring attached to the bottom of the tub or vessel and furnished with a pin and spring to stay or control and support the hoop or rim.

a is the tub or vessel with vertical ribs or projections, a^1, a^1, and a^2 is the grooved or flanged ring attached to the bottom of the tub or vessel, a; b is the disc or base of the dolly and b^1 the elongated boss or centre on its upper surface, with the projecting ribs b^2, b^2; b^3 is the horizontal projecting circular flange on the disc or base of the dolly b; c is the hoop or rim with its flanges or tongues, c^1 c^1, kept in close contact with the under side of the horizontal projecting circular flange, b^3, by means of the springs, c^2, and prevented from moving in a lateral direction by means of the perpendicular pins, c^3, c^3, and c^4 is one of the sockets into which the springs, c^2, and the perpendicular pins, c^3, pass for the purposes above mentioned.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is

1. The use, in circular washing machines with a revolving or reciprocating dolly, of a non-revolving hoop or rim arranged with flanges and sockets, stayed and controlled by perpendicular pins and supported on springs substantially in the manner and for the purposes hereinbefore described and shewn in the drawings hereunto annexed.

2. The use, in circular washing machines with a revolving or reciprocating dolly, of a grooved ring or a groove arranged with perpendicular pins and springs substantially in the manner and for the purposes hereinbefore described and shewn in the drawings hereunto annexed and

3. The combination and arrangement of parts constituting my improved washing machine constructed and employed substantially in the manner and for the purposes hereinbefore described and illustrated by the drawings on the sheet hereunto annexed.

Dated this 20th day of July 1892.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1892

51

G. L. DAVIS.

AGITATOR FOR WASHING MACHINES.

APPLICATION FILED FEB. 29, 1916.

1,240,826. Patented Sept. 25, 1917.

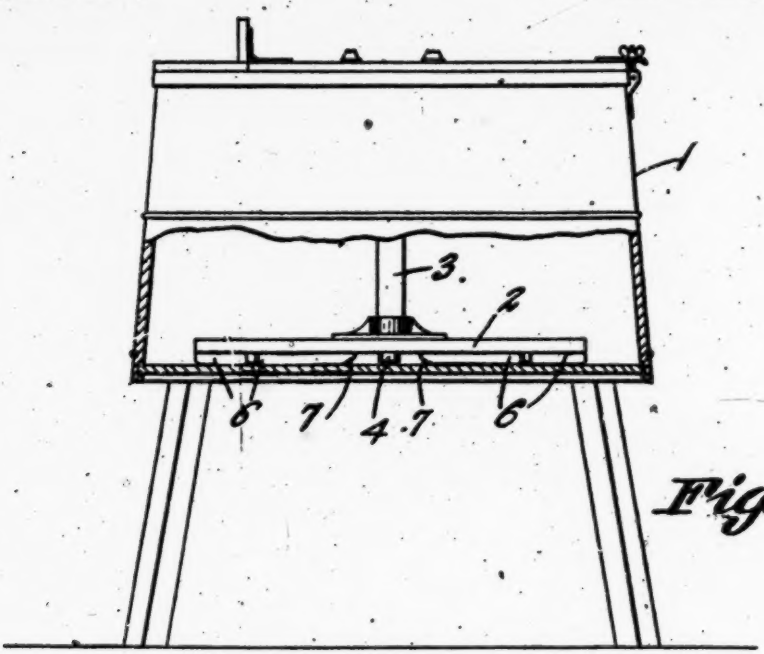


Fig. 1.

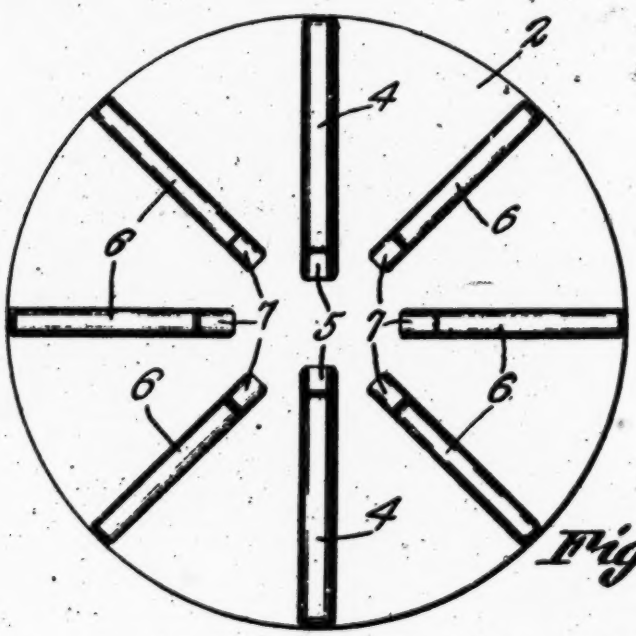


Fig. 2.

Witnesses

J. C. Emmerson
R. L. Parker.

G. L. Davis, Inventor

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE

GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK.

AGITATOR FOR WASHING-MACHINES.

1,240,826. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed February 29, 1916. Serial No. 81,200.

To all whom it may concern:

Be it known that I, GEORGE L. DAVIS, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented a new and useful Agitator for Washing-Machines, of which the following is a specification.

This invention relates to agitators for washing machines, the same being of the disk type designed for rotation back and forth within the tub of a washing machine.

One of the objects of the invention is to provide an agitator having a novel arrangement of ribs or vanes on the lower or active face thereof and which operate to direct the water outwardly by centrifugal force, thereby setting up a circulation downwardly within the tub adjacent the wall thereof, and thence upwardly through the fabrics in the tub and to the center of the space below the agitator.

A further object is to provide an agitator designed to float upon the water contained within the tub and the ribs on which will not only serve to set up a circulation of water as stated, but will also rub lightly upon the fabrics without danger of injuring them.

A still further object of my invention is to provide means in connection with the agitator disk to prevent churning of the washing fluid, and other means also in connection with said disk to cause the fluid flow lines to substantially conform to the shape of an elongated loop depressed intermediate its ends.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—

Figure 1 is a view partly in side elevation and partly in section of a washing machine having the present improvements combined therewith.

Fig. 2 is a bottom plan view of the agitator.

Referring to the figures by characters of reference 1 designates a tub of the inverted type (of greater diameter at the bottom than at the top), and arranged within the tub so as to rotate backwardly and forwardly is a disk 2 which can be driven in any manner desired, as by means of a shaft 3 connected to a suitable motor, not shown. This disk is provided on its lower or active face with opposed alining ribs 4 having their inner ends beveled as at 5, while their outer ends are substantially flush with the margin of the disk 2. Arranged at opposed sides of the ribs 4 and groups of radiating ribs 6 regularly spaced and having their inner ends beveled as at 7 while their outer ends are substantially flush with the margin of the disk 2. The inner ends of these ribs 6 are arranged in the arc of a circle, while the opposed ribs 4 extend inwardly closer to the center of the disk and are somewhat wider than the ribs 6. Thus the inner ends of the ribs 4 act as blades for engaging liquid contained within the circle defined by the inner ends of the ribs 6. Because of this peculiar arrangement of ribs 4 and 6, the fluid is caused to flow in lines similar in shape to an elongated loop depressed intermediate its extremities. The constancy of such flow lines eliminates eddies and other current irregularities preventive of a high degree of efficiency. It will be apparent that all of the spaces formed between the ribs on the disk communicate adjacent the center of the disk between the inner ends of the ribs, and that the lower face of the disk is flat and free of obstructions or projections other than the ribs. The beveled inner terminals of ribs 4 and 6 indicate the substantial configuration of an inverted bowl presenting no acute obstructions to the fluid flow lines consequent of rib depression and centrifugal force.

In using the agitator the tub is partly filled with water, after which the disk 2 is placed above the fabrics in the tub so as to float upon the water. The disk is then rotated backwardly and forwardly and during this movement the ribs 4 and 6 will have two functions. First they will throw the upper portion of the water by centrifugal force toward the wall of the tub, thus creating a suction under the center of the disk, with the result that the water displaced upwardly by this suction will force its way through the fabrics and will create a circulation inwardly adjacent the bottom of the tub and downwardly adjacent the wall thereof.

Thus the fabrics will be thoroughly cleaned without being pulled and distorted, the circulation of the water through the fabrics resulting in the removal of the dirt therefrom. In addition to the foregoing the ribs will act as rubbing elements inasmuch as they will engage lightly with the fabrics thereunder.

As has heretofore been pointed out, importance is attached to the particular construction and arrangement of the ribs on the disk. With this arrangement the shorter ribs 6 operate to throw the water outwardly by centrifugal force, creating a suction into the central space between the inner ends of the ribs. The water brought into this central space is engaged and thrown outwardly by the inner ends of the ribs 4 so that the centrifugal action of the agitator is materially increased by this particular arrangement

What is claimed is:—

In a washing machine the combination with a tub, of an agitating disk mounted to float on water in the tub, radial vanes upon the lower face of the disk adapted, when the disk is rotated, to direct the upper portion of the water outwardly by centrifugal force toward the wall of the tub and to draw water upwardly from the center of the bottom thereof, and a driving shaft for actuating the disk, said disk being freely movable vertically.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE L. DAVIS.

Witnesses:
ORD A. BRAZIL,
A. B. SMITH.

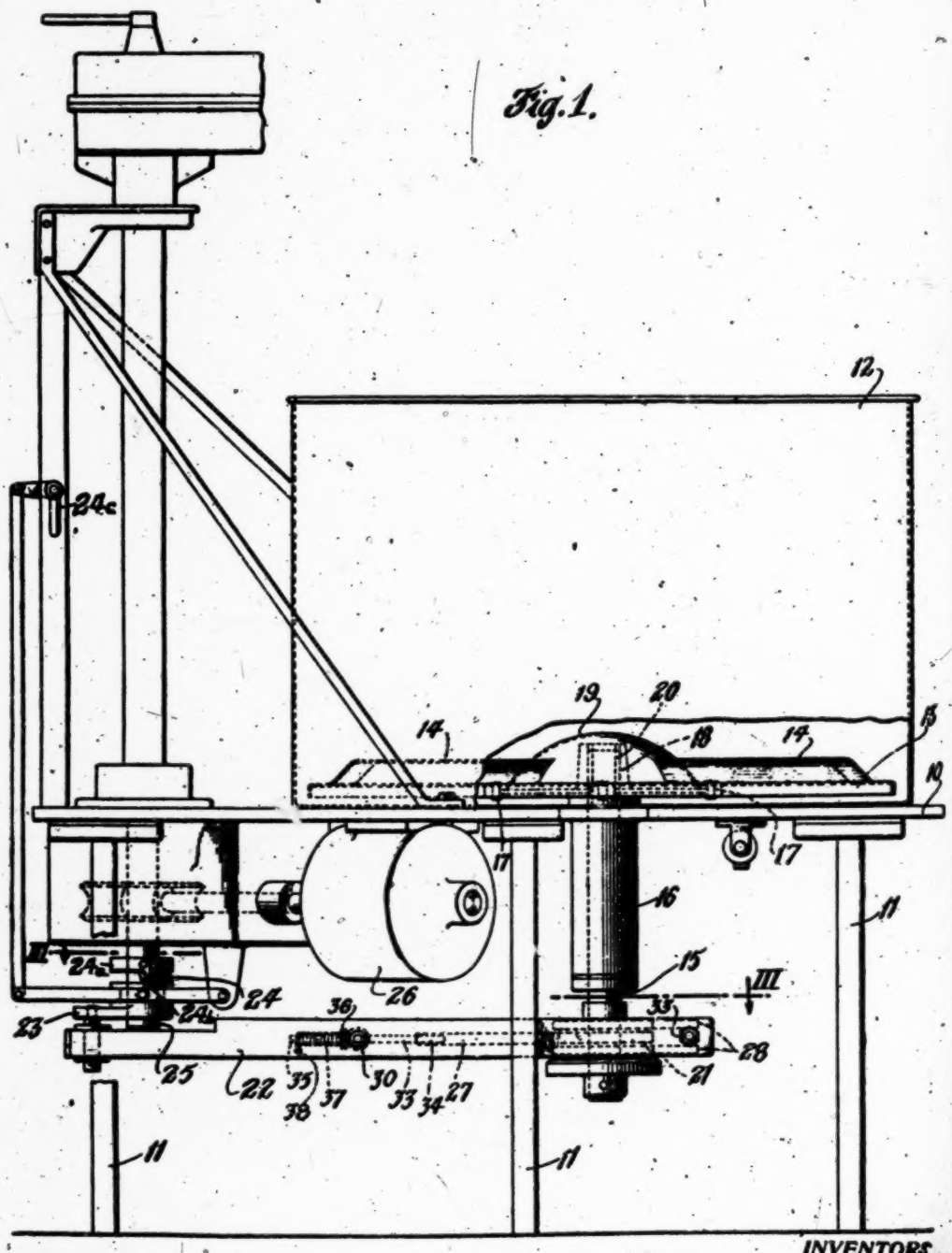
June 3, 1924. 1,496,305

H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 1

Fig. 1.



INVENTORS
Herman W. Doughty
George L. Davis

BY
Merrell C. Cook
ATTORNEY

June 3, 1924.

1,496,305

H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 2

Fig. 3.

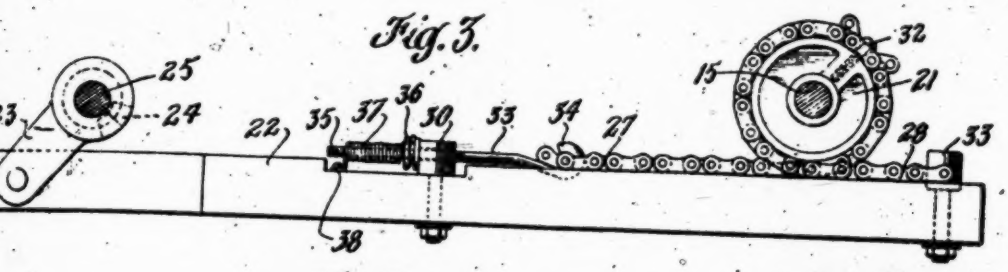


Fig. 4.

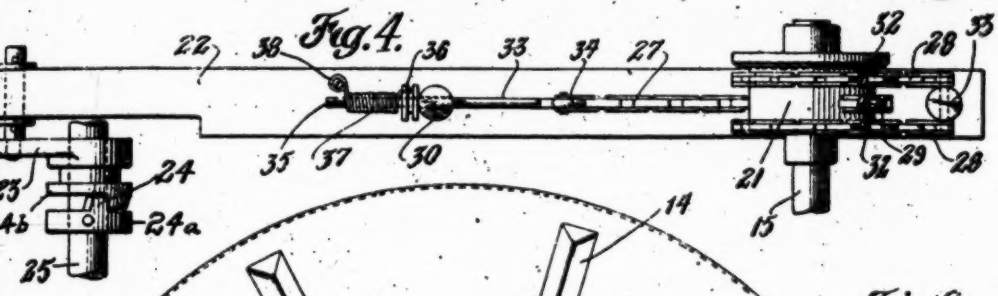


Fig. 2.

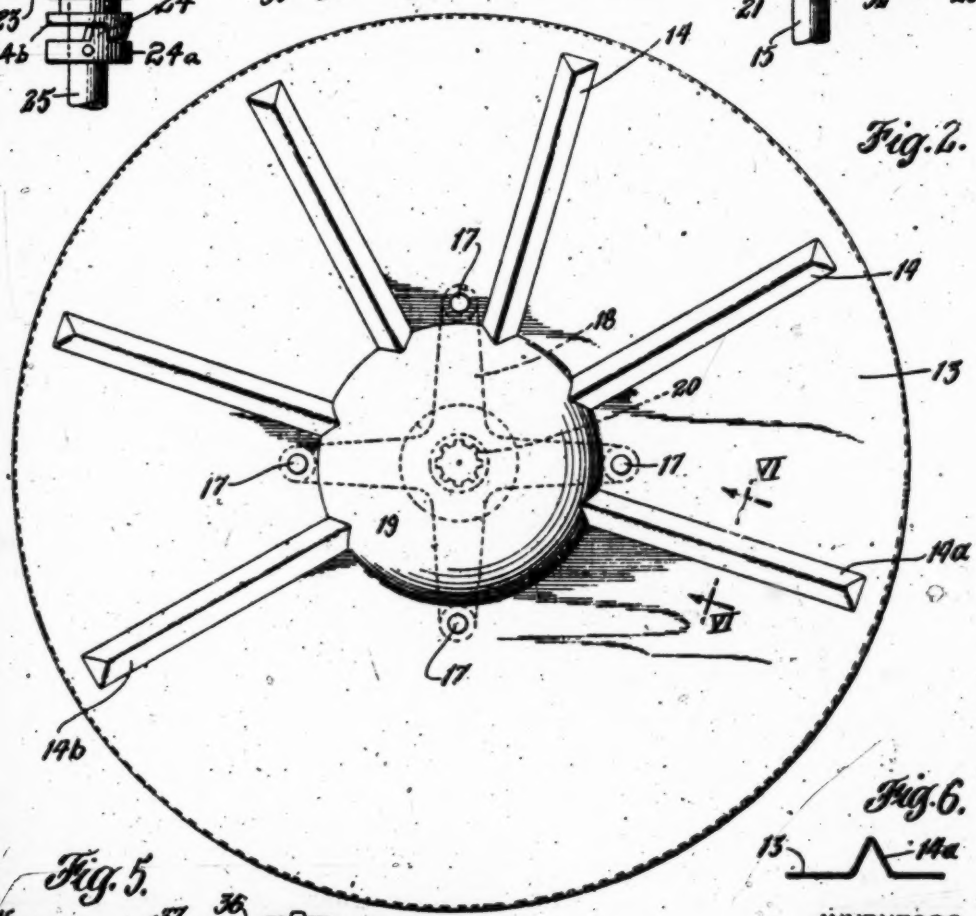
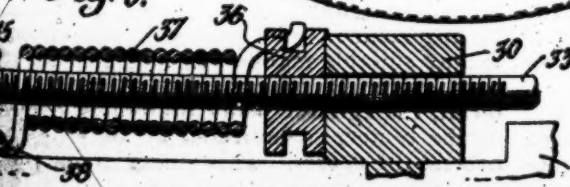


Fig. 6.

Fig. 5.



INVENTORS
Herman W. Doughty
George L. Davis
BY
Merrell C. Clark
ATTORNEY

Patented June 3, 1924. 1,496,305

UNITED STATES PATENT OFFICE.

HERMAN W. DOUGHTY AND GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK, ASSIGNORS TO THE NINETEEN HUNDRED WASHER COMPANY, OF BINGHAMTON, NEW YORK, A CORPORATION OF NEW YORK.

WASHING MACHINE.

Application filed April 8, 1922. Serial No. 550,607.

To all whom it may concern:

Be it known that we, HERMAN W. DOUGHTY and GEORGE L. DAVIS, citizens of the United States, and residents of Binghamton, county of Broome, and State of New York, have jointly invented certain new and useful Improvements in Washing Machines, of which the following is a description.

This invention relates to washing machines for washing clothes, and particularly to machines of this character which are operated by power as distinguished from hand-operated machines. Certain features of our invention, however, are applicable alike to machines of both of these types, as will appear hereinafter.

The primary object of our invention is to provide a machine of the character described, which shall be at once accessible, convenient and efficient.

The particular type of machine illustrated and described herein is what is sometimes called the "agitator" type. That is to say, it includes a stationary tub for receiving the clothes to be washed and the cleansing fluid, such as soapy water, and a movable "agitator" within the tub and adapted by its movement to agitate the cleansing fluid and the clothes and thus cause the cleansing fluid to penetrate the clothes and clean them. Heretofore the agitator in machines of this type has generally been so arranged as to overlie the clothes during the washing operation. This has made it necessary to remove the agitator before clothes could be placed in the tub or removed therefrom. In order to eliminate this inconvenience we have placed the agitator adjacent the bottom of the tub, so that it underlies the clothes, and we have discovered that an agitator so placed is more efficient if of an unsymmetrical design.

Accordingly it is one object of our invention to provide an agitator which is adapted to underlie the clothes, and which is so designed as to render it highly efficient.

Another object of our invention is to provide novel and efficient actuating means for the agitator.

Still another object of our invention is to provide improved means for mounting the agitator on its actuating shaft.

With these and other objects in view, as will appear hereinafter, our invention consists in the parts, combinations and devices described herein, and more particularly defined in the appended claims.

Referring to the drawings:

Fig. 1 is an elevation of our improved machine, partly in section;

Fig. 2 is a plan of the agitator;

Fig. 3 is a horizontal sectional view taken on the line III—III of Fig. 1;

Fig. 4 is an elevation of the parts shown in Fig. 3;

Fig. 5 is an enlarged sectional view of the chain tightening device shown in Figs. 3 and 4; and

Fig. 6 is a sectional view on line VI—VI of Fig. 2.

In the drawing 10 designates the frame for supporting our improved machine, which frame may be of any suitable design, as for example, that shown in the drawing (Fig. 1) wherein it is provided with three supporting legs 11. Upon this frame is mounted the tub 12, which may be of any desired shape and construction. As herein shown the tub is cylindrical in design. It is open at the top where it is preferably provided with a removable or hinged cover (not shown).

Located within the tub in such a position that it is adapted to underlie the clothes is the agitator 13, which is provided on its upper surface with agitating means such, for example, as the radially arranged vanes or ribs 14. In the particular construction shown these vanes or ribs are struck up from the sheet metal of which the agitator is made. They may, however, be of any other suitable construction, such for example as wooden ribs secured in any desired manner to a wooden or metal agitator.

The agitator 13 is of the rotary type, means (which we will describe later) being provided for oscillating it through the vertical shaft 15. This shaft 15 projects through the bottom of the tub 12. Leakage is prevented by the provision of a stuffing box such as indicated at 16. We preferably mount the agitator on the shaft 15 in the following manner. We secure the agitator 13 in any suitable manner, as indicated at 17, to a spider 18 of any suitable rigid material, the agitator being preferably domed at the center, as indicated at 19, so as to overlie the spider. This spider 18 in turn

is adapted for splined engagement with the shaft 15 as indicated at 20. By this construction we have provided means whereby the agitator is normally connected to oscillate with the shaft 15. but is adapted to be readily removed therefrom, for the purpose of cleaning the tub and the like, by merely lifting it off.

Referring now particularly to Fig. 2, it will be noted that the vanes or ribs 14 are unsymmetrically arranged. The purpose of so arranging the vanes is that we have found that if the agitator surface is symmetrical there is a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing. This action is apparently due to the fact that the oscillation of the agitator sets up currents in the fluid contents of the tub which move centrifugally of the agitator. And if the agitator is symmetrical these currents act with substantially equal force throughout the periphery of the agitator and tend to stretch the most available piece of laundry over the surface of the agitator and keep it there.

We have discovered, however, that by arranging the agitator unsymmetrically the equality of the currents is disturbed and as a result the piece of cloth in contact with the agitator will not be retained there but will be moved off to one side by the unequal currents acting upon it.

Many different unsymmetrical designs of agitators will accomplish this result and therefore come within the scope of our invention. The particular unsymmetrical design illustrated in Fig. 2 is formed by spacing one consecutive pair of vanes, such for example as the vanes 14ª. 14ᵇ, farther apart than other similar pairs. We have found that by using an agitator of this type no single piece of cloth remains in contact with the agitator for an undue length of time.

Coming now to the means for actuating the agitator, we provide the shaft 15 at a point below the bottom of the tank 12 with a drum 21 (Figs. 1, 3 and 4). Mounted adjacent this drum is the connecting rod 22 which is adapted to be reciprocated by the crank 23. This crank 23 is controlled by the clutch 24 and when the clutch is engaged the crank 23 is rotated by the vertical shaft 25, which in turn is operated by the motor 26, or any other suitable source of power.

The clutch 24 which we have provided is novel, so far as we are aware. It comprises the collar 24ª which is pinned or secured in any other desired manner to the vertical shaft 25, and the collar 24ᵇ which is integral with the crank 23 loosely mounted on said shaft. The collars 24ª, 24ᵇ, have coacting clutch teeth which, when the crank is elevated as shown in Fig. 1, engage to drive the crank. When, however, the crank is depressed the teeth are disengaged and the crank remains idle. Any suitable and convenient means, such as the hand lever 24ᶜ with its connections may be employed for elevating and depressing the crank 23 to engage and disengage the clutch.

The advantage of the clutch which we have described above resides primarily in its ease and economy of manufacture. It requires no keys, keyways or splines. All that is necessary, so far as the shaft 25 is concerned, is the securing of the collar 24 thereto, as by means of the pin illustrated.

The means for operatively connecting the connecting rod 22 to the drum 21, as herein shown, comprise two flexible members 27, 28. The member 27 may be in the form of a single chain 27, one end of which is secured to the drum at 29 and the other end of which is secured to the connecting rod 22 at a point 30 which is toward the crank end of the latter. The other flexible member 28 may be in the form of a double chain, one end of which is secured to the drum at the point 32 and the other end of which is secured to the connecting rod 22 at the point 33 which is at or toward the free end of the connecting rod. As will appear from the drawing, the flexible members 27 and 28 are so arranged that they are adapted to wind up on the drum 21 in opposite directions.

By virtue of the construction just described the drum 21 and through it the agitator 13 are oscillated in a regular and quiet manner.

In the course of continued oscillation of a part such as the agitator 13, considerable strain is placed upon the driving means, due largely to the rather sudden reversals in the direction of movement of the parts. As a result, if no provision were made to guard against it, the flexible members might become loose. The result would be an inefficient and noisy drive. Accordingly, we have provided means for automatically taking up any slack that may occur in the flexible members.

This automatic take-up means, as herein shown, comprises a bolt 33′. one end 34 of which is adapted to engage the flexible member 27 and the other end 35 of which passes through the eye 30 secured to the connecting rod 22. The end 35 is screw threaded and provided with a nut 36 which, in cooperation with the eye 30, secures the flexible member 27 to the connecting rod. For keeping this nut 36 tight we provide a spring such as 37. (Figs. 3. 4 and 5), one end of which is secured to the connecting rod 22 at 38 and the other end of which engages a

notch in the nut 36. During the reciprocation of the connecting rod 22 there are intervals of time, such as those occurring upon the reversal of movement, during which the flexible members are not subjected to tension by the normal operation of the machine. At such times, if there is any slack in the flexible members, the spring 37 will rotate the nut 36 and take it up. Thus the arrangement described serves to maintain the flexible members 27, 28, taut at all times.

The washing machine herein shown has been found in practice to be very efficient as a clothes washing mechanism and very convenient to operate and keep clean. The agitator being at the bottom and there being no obstruction in the tub above the agitator, it is a very simple matter to place clothes in the tub and to remove them therefrom. We are aware that agitators or dollys have heretofore been placed adjacent the bottom of the stationary tub of a washing machine. But so far as we are aware we are the first so to arrange the operating mechanism of an agitator which is located adjacent the bottom of the tub that there is no obstruction above the agitator. Also, the agitator as a whole may be readily removed from the tub when desired, for the purpose of cleaning. The actuating mechanism which we have provided for oscillating the agitator are particularly efficient and noiseless in operation, due in part to the automatic take-up means which we have provided.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any mechanical equivalent of the features shown and described, or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes of which those located at one portion of the agitator are spaced differently than the remainder.

2. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

3. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

HERMAN W. DOUGHTY.
GEORGE L. DAVIS.

58